## REMARKS

In response to the Final Office Action mailed August 30, 2004, Applicants respectfully request the Examiner to reconsider the above-captioned application in view of the above amendments and the following comments.

**Claim rejections**

Claims 35, 37, 38, 43-45 and 50-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Kim et al. in view of Suntola et al. and Yokoyama et al. Claims 46 and 47 are rejected over the combination of Kim, Suntola and Yokoyama and in further view of Tseng. Claim 57 is rejected over the combination Kim, Suntola, Yokoyama, and Tseng in further view of Lopatin et al. Claims 35, 39-41, 43, 44, 48, and 50-56 are rejected over the combination of Kim and Eichman. Claim 42 is rejected over the combination of Kim and Eichman in further view of Kukli et al.

In these rejections, the Examiner states that the primary reference (Kim) discloses an ALD reactor where the substrate support temperature is controlled independently of the reaction chamber. The Examiner admits that this reference does not explicitly teach that the substrate support temperature is maintained at a first temperature and the chamber wall is maintained at a second temperature, the difference between the two temperatures selected to maintain a lower rate of ALD film growth upon the chamber walls as compared to the substrate.

To address this deficiency, the Examiner states that Suntola and Eichman teach selecting the temperature of the chamber walls to maintain a lower rate of ALD film growth upon the chamber walls as compared to the substrate. However, as explained in the previous Response, Suntola and Eichman do not teach selecting the temperature of the chamber walls to maintain a lower rate of ALD film growth as compared to the substrate. Instead, Suntola merely discloses a hot wall reactor in which an atom or molecule may become "re-vaporized." However, there is no teaching that such "re-vaporization" must take place within the temperature range specified by Applicants' claims. Accordingly, Suntola does not necessarily disclose maintaining the chamber walls at a temperature to reduce ALD growth within the ALD window. Eichman, in turn, discloses a CVD reactor that utilizes a secondary plasma for the purpose of elevating the

temperature of the wall and promoting the deposit of particular material that is easily removed and different from the material deposited on the substrate. See Col. 6, lines 9-25.

Thus, the combination of Suntola and Eichman does not teach selecting the temperature of the chamber walls to maintain a lower rate of ALD film growth as compared to the substrate. Nevertheless, the Examiner states that it would be obvious to one of skill in the art in light of these references to maintain the walls of a reaction chamber at a temperature at which the walls are not easily contaminated by any mechanism in light of the general desire to reduce contamination on the walls of the reaction chamber.

However, the Examiner has not identified any teaching or suggestion for targeting or avoiding regions of decreased or increased ALD growth within the ALD temperature window. Applicants realized that within the ALD window there are temperature regions in which decreased OR increased growth per cycle may occur depending upon the process recipe. In contrast, the art cited by the Examiner does not disclose any understanding of the regions of increased and decreased growth within the ALD temperature window.

In fact, none of the references express any particular desire to stay within the ALD window when heating the reactor walls. Rather, the Examiner relies on references that have different motivations to heat the reactor walls. Suntola desires a revaporization effect, and nowhere teaches that ALD does or should still take place upon the walls, to say nothing of ALD at a reduced rate compared to the substrate. Eichman does not disclose anything about ALD processes, and so of course does not express any preference with respect to selecting a temperature relative to ALD temperature windows. At best the Examiner derives from this CVD reference that lower temperatures result in lower deposition rates. However, the fact that this is also true in the ALD context (and within the ALD window) can only be found in the present application. Yokoyama merely teaches that "hot wall" means that the reactor walls are hotter than the substrate, which does not exclude temperatures outside Applicants' recited temperatures.

Applicants recite a method of deposition in which care is taken to ensure that deposition takes place within a specific temperature boundaries. The fact that practicing Suntola's revaporization effect might result in falling within the recited temperature boundaries is insufficient to make a *prima facie* case of obviousness. In effect, the Examiner is stating that

practicing Suntola's process would inherently fall within Applicants' recited temperature boundaries. However, the law of inherency requires that the prior art must meet the limitations without failure: mere possibilities or probabilities are insufficient.

To the extent the Examiner relies on combinations of teachings in which Suntola teaches deposition at higher temperatures than the optimal ALD window, and other references teach a desire for reduced deposition on the reactor walls, Applicants submit that such combination can only be the result of hindsight. In the first place, the Examiner has not shown a desire in any of these references to maintain ALD growth on the reactor walls. That is, the references of record may express a general desire to reduce deposition, but there is no recognition that such reduced deposition should or would take place within the ALD window.

Secondly, the Examiner has not shown that combining these motivations would accomplish Suntola's purpose in his "multi-shot" or revaporization effect. The Examiner assumes that a general desire in other references to reduce reactor wall depositions is compatible with Suntola's multi-shot principle. However, there is no evidence to this effect. Certainly Suntola contains no disclosure with respect to the amount of deposition on the walls, and teaches only the effect upon the substrate. The Examiner has not shown anywhere from the prior art that the multi-shot principle is compatible with reducing growth on reactor walls, much less with reducing growth rates while staying within the ALD window. In other words, the Examiner has shown no desire from the prior art to make the asserted combinations.

In summary, none of the Examiner's references recognize the nested temperature windows disclosed in the present application, where the inner window represents optimal ALD growth and the outer window represents lower deposition rates but still suitable for ALD mechanisms. Accordingly, none of the references, individually or in combination, teach or suggest the recited invention.

CONCLUSION

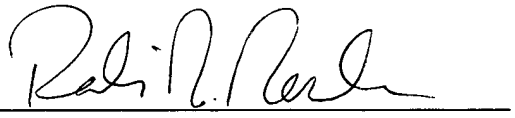
For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims and specification. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicants' attorney in order to resolve such issue promptly.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: November 30, 2004

By: 

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